1. A targeting cell comprising a vector, said vector comprising a nucleic acid sequence encoding a fusion protein, said fusion protein comprising:

(a) a targeting domain comprising a first member of an affinity pair; and

(b) a toxic domain comprising a toxic molecule,

wherein said targeting cell has significant binding affinity for a pathogenic cell, said targeting cell expressing and secreting said fusion protein, and said first member binds to a second member of said affinity pair, said second member being expressed on a surface of the pathogenic cell.

2. The targeting cell of claim 1, wherein said first member is a cytokine.

3. The targeting cell of claim 1, wherein said first member is selected from the group consisting of an antigen, a ligand for a cell adhesion receptor, a ligand for a signal transduction receptor, a hormone, and a molecule that binds to a death domain family molecule.

4. The targeting cell of claim 2, wherein said cytokine is interleukin (IL)-4.

5. The targeting cell of claim 2, wherein said cytokine is selected from the group consisting of IL-1, IL-2, IL-3, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12, IL-13, IL-15, interferon (IFN)-α, IFN-β, IFN-γ, tumor necrosis factor (TNF)-α, a transforming growth factor (TGF), granulocyte-macrophage colony stimulating factor (GM-CSF), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF).

6. The targeting cell of claim 1, wherein said second member is a cytokine receptor.

7. The targeting cell of claim 1, wherein said second member is selected from the group consisting of an antibody, a cell adhesion receptor, a signal transduction receptor, a hormone receptor, and a major histocompatibility complex (MHC) molecule-peptide complex.

8. The targeting cell of claim 6, wherein said second member is an IL-4 receptor (IL-4R).

9. The targeting cell of claim 6, wherein said second member is a receptor for a cytokine selected from the group consisting of IL-1, IL-2, IL-3, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12, IL-13, IL-15, IFN-α, IFN-β, IFN-γ, TNF-α, TGF, GM-CSF, VEGF, and EGF.

10. The targeting cell of claim 1, wherein said pathogenic cell is a cancer cell.

11. The targeting cell of claim 10, wherein said cancer cell is a malignant hematological cell.

12. The targeting cell of claim 10, wherein said cancer cell is selected from the group consisting of a neural tissue cancer cell, a melanoma cell, a breast cancer cell, a lung cancer cell, a gastrointestinal cancer cell, an ovarian cancer cell, a testicular cancer cell, a lung cancer cell, a prostate cancer cell, a cervical cancer cell, a bladder cancer cell, a vaginal cancer cell, a liver cancer cell, a renal cancer cell, a bone cancer cell, and a vascular tissue cancer cell.

13. The targeting cell of claim 1, wherein said pathogenic cell is associated with pathogenesis of an autoimmune disease.

14. The targeting cell of claim 13, wherein said pathogenic cell is selected from the group consisting of a CD4+ T lymphocyte, a CD8+ T lymphocyte, a B lymphocyte, a monocyte, and a macrophage.

15. The targeting cell of claim 1, wherein said targeting cell is a CD8+ T lymphocyte.

16. The targeting cell of claim 1, wherein said targeting cell is selected from the group consisting of a CD4+ T lymphocyte, a B lymphocyte, a natural killer (NK) cell, a lymphokine-activated killer (LAK) cell, a monocyte, and a macrophage.

17. The targeting cell of claim 1, wherein said toxic molecule is diphtheria toxin (DT).

18. The targeting cell of claim 17, wherein said toxic molecule comprises amino acids 1-390 of DT.

19. The targeting cell of claim 1, wherein said toxic molecule is selected from the group consisting of ricin, *Pseudomonas* exotoxin (PE), bryodin, gelonin, α-sarcin, aspergillin, restrictocin, angiogenin, Pseudomonas exotoxin, saporin, abrin, and pokeweed antiviral protein (PAP).

20. The targeting cell of claim 1, wherein the vector is a retroviral vector.

21. The targeting cell of claim 1, wherein the vector is selected from the group consisting of a plasmid, an adenoviral vector, a adeno-associated viral vector, a vaccinia viral vector, a lentiviral vector, and a herpes viral vector.

22. A population of cells, wherein each of a substantial number of said cells of said population is said targeting cell of claim 1.

23. The targeting cell of claim 1, said vector further comprising, 5' of the 5' end of said encoding sequence, a mammalian signal sequence.

24. The targeting cell of claim 23, wherein said signal sequence is a signal sequence encoding a natural leader sequence of said first member.

25. The targeting cell of claim 24, wherein said first member is IL-4.

26. The targeting cell of claim 13, wherein said autoimmune disease is selected from the group consisting of rheumatoid arthritis (RA), insulin-dependent diabetes mellitus (IDDM), and multiple sclerosis.

27. The targeting cell of claim 13, wherein said autoimmune disease is selected from the group consisting of systemic lupus erythematosus (SLE) and myasthenia gravis (MG).

28. The targeting cell of claim 1, wherein said pathogenic cell is a cell that is infected with a microorganism.

29. The targeting cell of claim 28, wherein said microorganism is a virus.

30. The targeting cell of claim 29, wherein said virus is a human immunodeficiency virus (HIV).

31. The targeting cell of claim 30, wherein said first member is selected from the group consisting of CD4, CCR4, and CCR5.

32. The targeting cell of claim 30, wherein said second member is an envelope glycoprotein.

33. The targeting cell of claim 28, wherein said microorganism is selected from the group consisting of a bacterium and a protozoan parasite.

34. A method of treating a subject with a pathogenic cell disease, said method comprising administering said cell population of claim 20 to said subject.

35. A method of treating a subject with a pathogenic cell disease, said method comprising administering a vector to the subject, said vector comprising a nucleic acid sequence encoding a fusion protein including:

(a) a targeting domain comprising a first member of an affinity pair or a functional fragment thereof; and

(b) a toxic domain comprising a toxic molecule or a functional fragment thereof,

wherein said first member binds to a second member of the affinity pair, said second member being expressed on the surface of the pathogenic cell.

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36. A method of making said cell population of claim 22, the method comprising:

(a) providing a cell preparation wherein each of a substantial number of said cells of said preparation has significant binding affinity for a pathogenic cell; and

(b) transfecting or transducing said cells of said preparation with a vector comprising a DNA sequence encoding a fusion protein including:

(i) a targeting domain comprising a first member of an affinity pair; and

(ii) a toxic domain comprising a toxic molecule,

wherein, after said transfection or said transduction, a significant number of said cells of said preparation express and secrete the fusion protein, and said first member binds to a second member of the affinity pair, said second member being expressed on a surface of said pathogenic cell.

37. The method of claim 36, further comprising, after said transfection or said transduction, enriching for cells expressing and secreting said fusion protein.

Sub a2

38. A vector comprising a nucleic acid sequence encoding a fusion protein, said fusion protein comprising:

(a) a targeting domain comprising a first member of an affinity pair;

(b) a toxic domain comprising a toxic molecule; and

(c) transcriptional and translational regulatory sequences operably linked to said DNA sequence, said regulatory sequences allowing for expression of said fusion protein in a cell of a mammal,

wherein said first member binds to a second member of said affinity pair, said second member being expressed on a surface of a pathogenic cell.

39. The vector of claim 38, further comprising, 5' of the 5' end of said encoding sequence, a signal sequence.

40. The vector of claim 39, wherein said signal sequence is a signal sequence encoding a natural leader sequence of said first member.

41. The vector of claim 40, wherein said first member is IL-4.

42. The vector of claim 38, wherein the vector is a retroviral vector.

Sub a3

43. The vector of claim 38, wherein the vector is selected from the group consisting of a plasmid, an adenoviral vector, a adeno-associated viral vector, a vaccinia viral vector, a lentiviral vector, and a herpes viral vector.